

WHAT IS CLAIMED IS:

1. A non-human animal model characterized by having abnormal DGAT activity, wherein said abnormal DGAT activity results from a DGAT genomic modification.
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2. The animal model according to Claim 1, wherein the animal is further characterized by having decreased endogenous DGAT expression relative to a corresponding wild-type control.
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3. The animal according to Claim 2, wherein the animal is heterozygous for a defect in an endogenous DGAT gene.
4. The animal according to Claim 2, wherein the animal is homozygous for a defect in an endogenous DGAT gene.
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5. The animal according to Claim 4, wherein said animal is an endogenous DGAT gene knockout animal.
6. The animal according to Claim 5, wherein said animal further comprises an exogenous DGAT coding sequence which is expressed in said animal.
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7. The animal according to Claim 6, wherein said exogenous DGAT coding sequence is a human DGAT coding sequence.
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8. The animal according to Claim 1, wherein the animal is further characterized by having increased endogenous DGAT expression relative to a corresponding wild-type control.
9. The animal according to Claim 8, wherein said increased endogenous DGAT expression results from the presence of extra endogenous DGAT coding sequences.
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10. A cell having a disrupted endogenous DGAT locus.

11. The cell according to Claim 10, wherein said cell is an endogenous DGAT knockout.

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12. The cell according to Claim 11, wherein said cell is a non-human cell.

13. The cell according to Claim 12, wherein said cell is a mouse cell.

10 14. The cell according to Claim 13, wherein said cell further comprises a coding sequence for a human DGAT polypeptide, wherein said coding sequence is expressed in said cell.

15 15. A screening assay for determining a candidate agent's DGAT modulatory activity, said method comprising:  
(a) contacting a DGAT polypeptide with said candidate agent; and  
(b) detecting any change in activity of said DGAT polypeptide compared to a control to determine said candidate agent's DGAT modulatory activity.

20 16. The screening assay according to Claim 15, wherein said DGAT modulatory activity is inhibitory activity.

17. The screening assay according to Claim 16, wherein said DGAT polypeptide is a human DGAT.

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18. The screening assay according to Claim 16, wherein said DGAT polypeptide is mouse DGAT.

30 19. The screening assay according to Claim 16, wherein said screening assay is an in vitro screening assay.

20. The screening assay according to Claim 16, wherein said screening assay is an in vivo screening assay.

21. The screening assay according to Claim 20, wherein said contacting comprises introducing said candidate agent into a cell that includes said DGAT polypeptide.

22. The screening assay according to Claim 21, wherein said cell is a cell according to Claim 14.

23. The screening assay according to Claim 21, wherein said contacting comprises administering said candidate agent to an animal according to Claim 1.

24. A screening assay for determining a candidate agent's DGAT expression modulatory activity, said assay comprising:

(a) contacting a DGAT polypeptide expression cassette with said candidate agent; and

(b) detecting any change in expression of said DGAT polypeptide expression cassette compared to a control to determine said candidate agent's DGAT expression modulatory activity.

25. The screening assay according to Claim 24, wherein said expression modulatory activity is inhibitory activity.

26. The screening assay according to Claim 24, wherein assay is in vitro.

27. The screening assay according to Claim 24, wherein said assay is in vivo.

28. The screening assay according to Claim 24, wherein said DGAT polypeptide is a human DGAT.

29. The screening assay according to Claim 24, wherein said DGAT polypeptide is

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a mouse DGAT.

30. A non-human polypeptide having DGAT activity present in other than its naturally occurring environment, wherein when said polypeptide has the amino acid  
5 sequence of a naturally occurring protein it is substantially free of any of its constituents of its naturally occurring environment.

31. The polypeptide according to Claim 30, wherein said polypeptide has an amino acid sequence of a naturally occurring DGAT protein.

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32. The polypeptide according to Claim 31, wherein said naturally occurring DGAT protein is an animal DGAT protein.

33. The polypeptide according to Claim 32, wherein said animal DGAT protein is  
15 a mammalian DGAT protein.

34. The polypeptide according to Claim 33, wherein said DGAT protein is a mouse protein.

20 35. The polypeptide according to Claim 34, wherein said mouse DGAT protein comprises SEQ ID NO:07.

36. Substantially pure mammalian non-human DGAT.

25 37. Isolated mammalian non-human DGAT.

38. A fragment of a polypeptide according to Claim 30.

30 39. A monoclonal antibody binding specifically to a polypeptide having DGAT activity.

40. The monoclonal antibody according to Claim 39, wherein said antibody inhibits DGAT activity of said polypeptide.

41. A method for inhibiting the activity of a DGAT protein, said method comprising:  
5 contacting said DGAT protein with an agent that inhibits the activity of said DGAT protein.

42. The method according to Claim 41, wherein said agent is a small molecule.

43. The method according to Claim 42, wherein said agent is an antibody.

44. The method according to Claim 42, wherein said agent is a monoclonal antibody.

45. A method of modulating a symptom in a mammalian host of a disease condition associated with DGAT activity, said method comprising:  
administering to said host a pharmaceutical composition comprising an effective amount of an active agent that modulates said DGAT activity in said host.

46. The method according to Claim 45, wherein said symptom is hypertriglycemia.

47. The method according to Claim 45, wherein said symptom is obesity

48. A plant polynucleotide present in other than its natural environment encoding a product having DGAT activity.

49. The polynucleotide according to Claim 48, wherein said polynucleotide comprises a sequence substantially similar or identical to SEQ ID NO: 04.

50. A nucleic acid that hybridizes under stringent conditions to a nucleic acid

consisting of SEQ ID NO:04.

51. A plant polypeptide having DGAT activity present in other than its naturally occurring environment, wherein when said polypeptide has the amino acid sequence of  
5 a naturally occurring protein it is substantially free of any of its constituents of its naturally occurring environment.

52. The polypeptide according to Claim 51, wherein said polypeptide has an amino acid sequence of a naturally occurring DGAT protein.

53. The polypeptide according to Claim 52, wherein said plant DGAT protein comprises a sequence encoded by a polynucleotide comprising the sequence of SEQ ID NO:04.

54. A fragment of a polypeptide according to Claim 51.

55. An expression cassette comprising a transcriptional initiation region functional in an expression host, a polynucleotide having a nucleotide sequence found in the nucleic acid according to Claim 48 under the transcriptional regulation of said  
20 transcriptional initiation region, and a transcriptional termination region functional in said expression host.

56. A cell, or the progeny thereof, comprising an expression cassette according to Claim 55 as part of an extrachromosomal element or integrated into the genome of a  
25 host cell as a result of introduction of said expression cassette into said host cell.

57. A method of producing a polypeptide having plant DGAT activity, said method comprising:

30 growing a cell according to Claim 56, whereby said polypeptide is expressed;  
and  
isolating said polypeptide substantially free of other proteins.

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58. An antibody binding specifically to a polypeptide having plant DGAT activity.
59. A method of producing a triacylglycerol, said method comprising:
  - 5 contacting a diacylglycerol and fatty acyl CoA with a plant DGAT polypeptide under conditions sufficient to said triacylglycerol to be produced.
60. A *DGAT* transgenic plant.
- 10 61. The transgenic plant according to Claim 60, wherein said plant is capable of producing seeds higher in oil content than the corresponding wild-type.
62. The seeds produced by the plant according to Claim 61.
- 15 63. A method of producing an oil seed having a higher oil content as compared to wild-type, said method comprising:
  - growing a *DGAT* transgenic plant according to Claim 61; and
  - harvesting seeds from said *DGAT* transgenic plant.
- 20 64. In a method of producing oil from seeds, the improvement comprising:
  - producing oil from the seeds produced according to the method of Claim 63.
65. In a method of identifying a plant *DGAT* polynucleotide, the improvement comprising:
  - 25 employing a probe comprising a sequence substantially similar or identical to SEQ ID NO:04 to identify said plant *DGAT* polynucleotide.